Recruitment and Biodiversity Studies on ENSO-Impacted Coral Reefs in Panamá

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20-24 January 2003

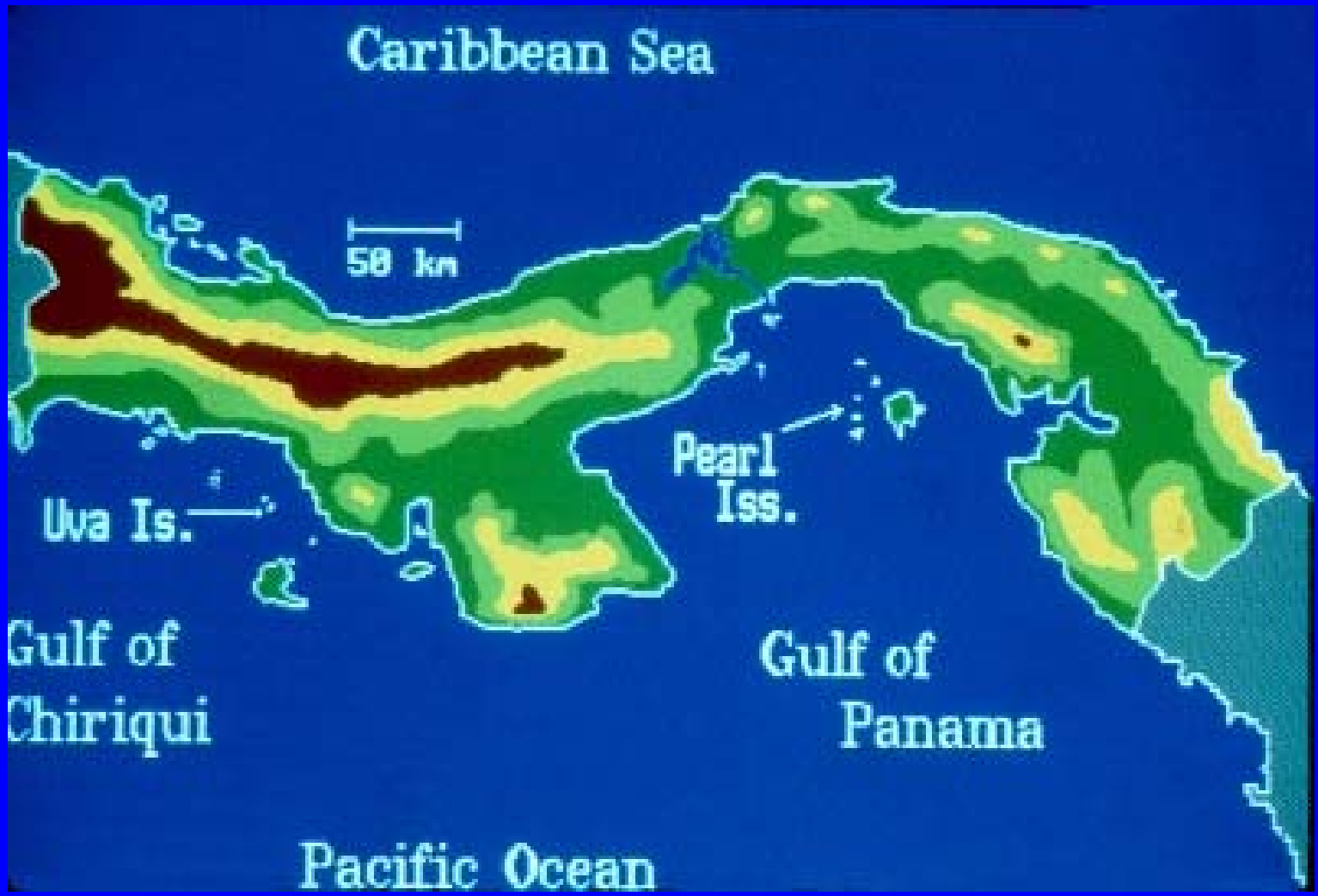
What is the fate of coral reef communities following a severe bleaching event with high coral mortality?

How does bioerosion and loss of coral reef frameworks affect reef-associated biotas?

What effect does reef framework loss have on the abundance and diversity of vagile coral reef organisms?

H_o: Abundance and species diversity of vagile coral reef fauna are equal in framework and rubble plain habitats

Uva Island Location, Gulf of Chiriquí, Panamá



Uva Island coral reef, low tidal exposure

Live *Pocillopora* framework

Dead pocilloporid framework – killed by elevated ENSO temperatures

Sea urchins eroding dead *Pocillopora* coral framework

Experimental units: 3-Dimensional Rubble Structures

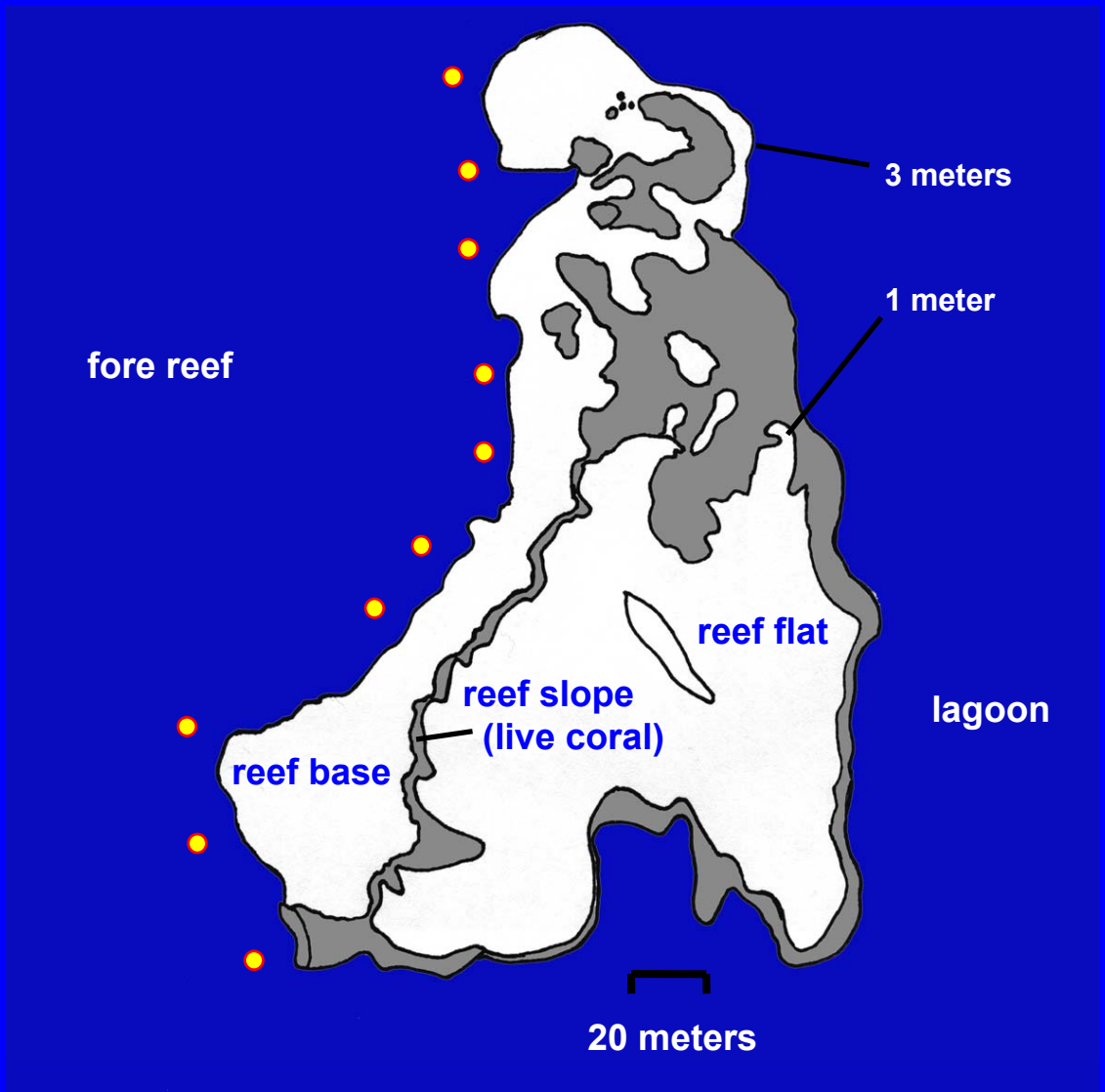
Experimental units: 2-Dimensional Rubble Plain

Experimental design and sampling

- *Pocillopora* rubble retained by 1” stretch-mesh netting (ca. 8-15 cm, max. dimension)
- Four bags per site (10 sites)
- Rubble volume per bag = 23-30 liters
- Rubble volume on sand plain = 5-12 liters
- Systematic random design
- Bag and sand plain sampling every 6 mo.

Uva Island: Experimental Units

Location of sampling sites



Goals – determine effects of reef-frame loss

- Species abundances
- Species diversity
- Species biomass
- Must express per total surface area/pore space available
- Determine community development (temporal recruitment, species succession, growth rates, interspecific interactions)

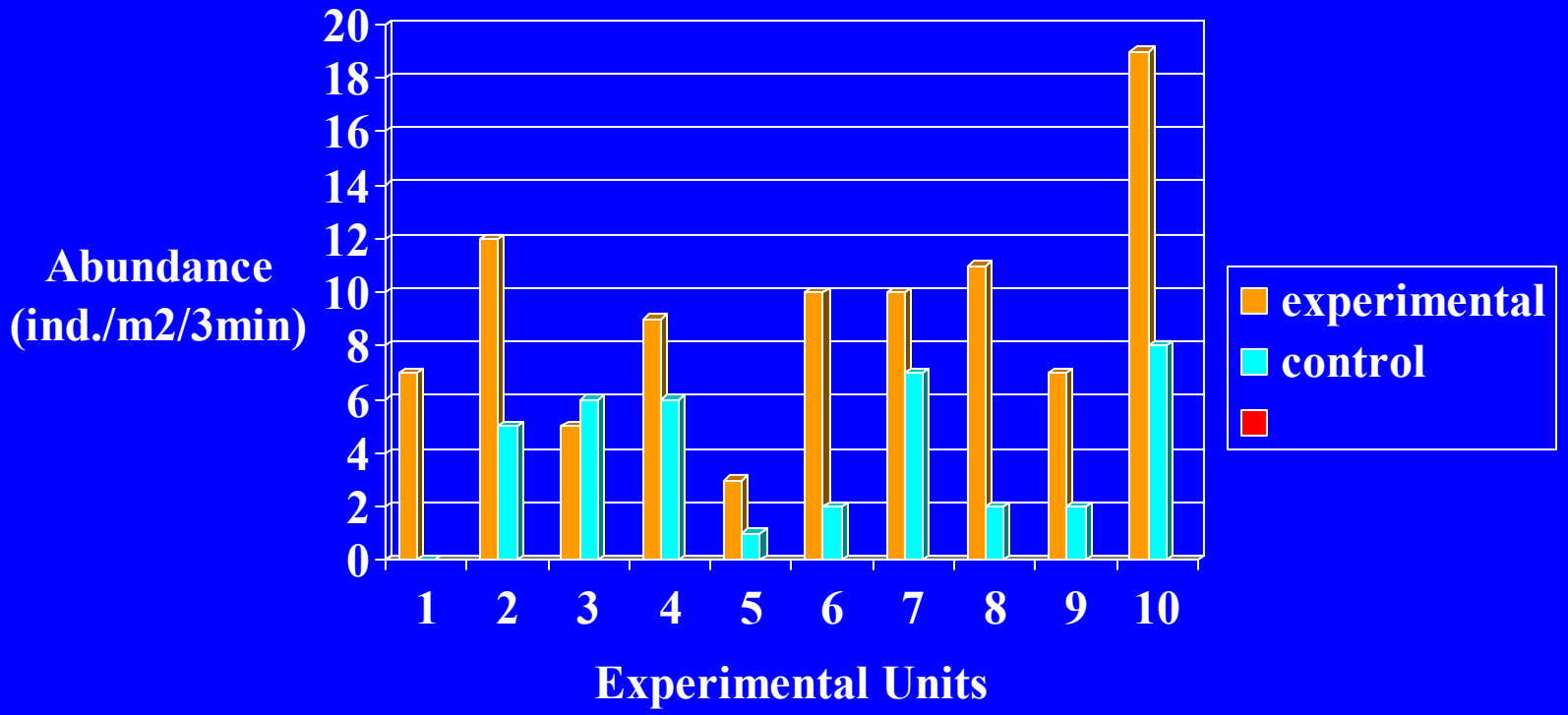
Advantages of this kind of study

- Non-destructive quantitative sampling of cryptic reef species (coelobites)
- Can quantify abundances and diversity in terms of habitat space
- Can manipulate re size, complexity, location, and presence/absence of live coral
- Allows for replicate sampling and regional comparisons

Metazoans found in 3- vs. 2-dimensional experimental units

- Sea urchins (*Diadema*, *Eucidaris*)
- Sea cucumbers
- Opisthobranchs
- Echiurans
- Sipunculans
- Fishes (soapfish, scorpionfishes, frogfishes, moray eels, brotula, cardinalfish,

Fish abundances at rubble piles vs. sediment plains 18 Mar. ‘02



Fish abundances at rubble piles vs. sediment plains (17 Sep. ’02)